to the vacuum enclosure , which in turn is fastened on the basic field magnetic system, to a surface of the apparatus, where they are transformed into noise.

United States Patent No. 6,043,653 discloses a magnetic resonance apparatus in which a gradient coil system and a basic field magnetic system are set up independently of each other on a base, and as a result are substantially decoupled from each other, and the gradient coil system is additionally arranged in a vacuum enclosure.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved magnetic resonance apparatus in which noise affecting an object under investigation can be reduced in a highly effective and low-cost way.

The object is achieved in accordance with the invention in a magnetic resonance apparatus disposed in an installation space, the apparatus having a first component group, which includes at least a basic field magnet system and a gradient coil system, a second component group, which includes (defines) examination volume for receiving an object under investigation and which includes at least one supporting device for bringing the object under investigation supported thereon it into the examination volume, and a sound insulation, which is arranged between the first and second component groups to divide the installation space into two spaces which are sound-insulated from each other, a first of the spaces containing the first component group and a second of the spaces containing the second component group.

As a result, it is possible by a comparatively minor modification of commercially available magnetic resonance apparatuses to achieve a noise reduction of more than 40 dB for the object under investigation in a low-cost way.

## DESCRIPTION OF THE DRAWING

The single figure is a side view, partly in section, of a magnetic resonance imaging apparatus constructed and operating in accordance with the principles of the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

The figure shows, as an exemplary embodiment of the invention, a longitudinal section of a magnetic resonance apparatus arrangement. The magnetic resonance apparatus has a first component group, which includes a basic field magnet system 12 for generating a base magnetic field, a gradient coil system 14 for generating gradient fields and an antenna system 16 for radiating radio-frequency signals into a patient 50 and for receiving magnetic resonance signals thereby triggered. In this case, the basic field magnet system 12, the gradient coil system 14 and the antenna system 16 are of a substantially hollow-cylindrical form. The gradient coil system 14 is in this case arranged concentrically in a cavity of the basic field magnet system 12, and the antenna system 16 is in turn arranged concentrically in a cavity of the gradient coil system 14. A vacuum vessel 34 extends into a remaining cavity of the first component group.

The vacuum vessel 34 is designed as a cylindrical double-wall vessel, which has an outer vessel wall 36 and an inner vessel wall 38. Between the two vessel walls 36 and 38, therefore arranged concentrically in relation to each other, is a vacuum. The vacuum vessel 34 is provided with a valve 42, via which the vacuum vessel 34 can be evacuated by a vacuum pump 44 connected to the valve 42. This is required, for example, to evacuate a vacuum vessel 34 that is not seamless to its rated vacuum quality, for example after a certain amount of time has passed or following installation work. In another embodiment, in which the vacuum vessel 34 is of a seamless

configuration, for example as a result of hermetic welding, it is possible to dispense with the valve 42 and the vacuum pump 44.

The open side of the vacuum vessel 34 is joined to a substantially circular opening of a heavy sound-insulating wall 32. Together with the sound-insulating wall 32, the vacuum vessel 34 represents an interface between a first space 10, which contains the first component group, and a second space 20, which contains an examination volume 24 for receiving the patient 50. In this case, the two spaces 10 and 20 are separated from each other in a sound-insulating manner by the vacuum vessel 34 together with the sound-insulating wall 32.

In order to prevent direct mechanical transmission of vibrations can take place from the first component group to the vacuum vessel 34 and the sound-insulating wall 32, the vacuum vessel 34 and the sound-insulating wall 32 have no direct contact surfaces with the first component group. Consequently, vibration transmission is only possible via intermediate layers of air and via a base of the space 10. The vibrations transmitted to the base of the space 10 are damped due to the heaviness of the base so that vibration propagation is substantially prevented. The same applies to vibrations coupled in via the air of the space 10 to the sound-insulating heavy wall 32 and the remaining ceilings and walls of the space 10. Vibrations coupled in via the air to the outer vessel wall 36 of the vacuum vessel 34 are not transmitted to the inner vessel wall 38, facing the second space 20, because of the vacuum. It is important in this case that the outer vessel wall 36 and the inner vessel wall 38 are configured and fastened in such a way that they are vibration-decoupled from each other at the opening of the sound-insulating wall 32, so that no vibration transmission between the vessel walls 36 and 38 takes place at this point either. Furthermore, the vessel walls 36 and 38 are